ARCUATE FIXATION MEMBER

CROSS-REFERENCE TO RELATED APPLICATIONS

This patent application claims priority to U.S. provisional patent application No. 61/169,461, filed Apr. 15, 2009, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

The present disclosure relates generally to orthopedics, and in particular relates to fixation systems, intervertebral implants, and associated surgical methods and procedures for using same.

BACKGROUND

Spinal fixation systems such as pedicle screw and rod constructs are commonly used to promote fusion between interverterbral bodies. The insertion of pedicle screws typically requires a linear "line-of-approach" trajectory that is aligned with the longitudinal axis of the screw, in order to accommodate the access and delivery instruments. Similarly, anchors such as bone screws may be used to directly fix intervertebral implants to vertebral bodies, typically requiring the insertion of several screws at unique angles oblique to the sagittal and/or transverse plane, and thus multiple lines-of-approach. However, in a variety of surgical situations, achieving a desired trajectory for screw insertion can be difficult due to the patient's anatomy obstructing a linear line-of-approach. For example, medially-directed placement of pedicle screws into the sacrum is desirable to prevent screw loosening and/or pullout, but can be prohibited due to the iliac crest obstructing the linear line-of-approach.

In addition to the above-discussed linear line-of-approach problems, limitations of the fixation anchors themselves can further limit spinal fixation treatment approaches. For example, unilateral spinal fixation procedures, wherein a pedicle screw and rod construct is placed on a single side of the spine, provide advantages such as limiting surgical site morbidity and shortening surgical time when compared with standard bilateral fixation procedures wherein the construct is placed on both sides of the spine and interconnected. However, unilateral fusion constructs typically exhibit decreased mechanical rigidity in comparison to bilateral constructs, for example due to lower torsional and/or rotational rigidity and weaker resistance to screw pullout forces under physiologic loading when compared to typical bilateral constructs. As a result, unilateral fixation procedures are rarely performed in lieu of bilateral fixation procedures.

What is therefore desirable are spinal fixation systems that allow for the creation of rigid constructs when the linear line-of-approach for insertion of fixation anchors is unavailable and/or undesirable (e.g., when multiple anchors are required), while at the same time providing increased rigidity and robustness to spinal constructs such as those used in unilateral fusion procedures.

SUMMARY

Arcuate fixation members with varying configurations and/or features are disclosed, along with additional components for use therewith in disclosed fixation systems and intervertebral implant systems. The arcuate fixation members may be of varying lengths, cross sectional geometries, and/or cross sectional areas, and may be configured with various features such as heads configured to accept other fixation system components, tabs to allow arcuate fixation member-in-arcuate fixation member or fixation anchor-in-arcuate fixation member configurations. Fixation systems or intervertebral implant systems utilizing arcuate fixation members are particularly suitable when a linear line-of-approach for delivering fixation members is undesirable.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing summary, as well as the following detailed description of the preferred embodiments of the application, will be better understood when read in conjunction with the appended drawings. For the purposes of illustrating the arcuate fixation member systems and methods, there are shown in the drawings preferred embodiments. It should be understood, however, that the instant application is not limited to the precise arrangements and/or instrumentalities illustrated in the drawings, in which:

FIG. **1**A is a front elevation view of an arcuate fixation member constructed in accordance with an embodiment;

FIG. **1**B is a side elevation view of the arcuate fixation member illustrated in FIG. **1**A;

FIGS. **1**C-**1**F are cross sectional views illustrating embodiments of various example geometries of the arcuate fixation member illustrated in FIGS. **1**A and **1**B;

FIG. **1**G is a perspective view of an embodiment of an arcuate fixation member constructed in accordance with another embodiment;

FIG. **1**H is a perspective view of a guiding member for receiving an arcuate fixation member;

FIG. **2** is a cranial-caudal view of a vertebral body with a pair of arcuate fixation members and guiding members inserted therein;

FIG. **3** is a posterior view of the assembly illustrated in FIG. **2**;

FIG. **4**A is a side elevation view of an arcuate fixation member constructed in accordance with another embodiment;

FIG. **4**B is a top elevation view of the arcuate fixation member illustrated in FIG. **4**A;

FIG. **4**C is a side elevation view of an embodiment of the arcuate fixation member illustrated in FIG. **4**A in combination with a fixation anchor;

FIGS. **4**D and **4**E are side elevation views of additional embodiments of the arcuate fixation member and fixation anchor illustrated in FIG. **4**C;

FIG. **4**F is a side elevation view of an embodiment of the arcuate fixation member illustrated in FIG. **4**A in combination with an embodiment of the arcuate fixation member illustrated in FIGS. **1**A and **1**B;

FIG. **4**G is a top elevation view of the arcuate fixation member illustrated in FIG. **4**F, without the arcuate fixation member illustrated in FIGS. **1**A and **1**B;

FIG. **5** is a cranial-caudal view of a vertebral body with the arcuate fixation member illustrated in FIG. **4**C inserted therein;

FIG. **6** is a cranial-caudal view of a vertebral body with the arcuate fixation member illustrated in FIG. **4**F inserted therein;

FIG. **7** is a posterior view of an example spinal fixation construct utilizing embodiments of the arcuate fixation members illustrated in FIG. **4**F; and

FIGS. **8**A and **8**B are side elevation views of an embodiment of an arcuate fixation member delivery instrument;